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IFS MC251-4P/1CXT User Manual

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Version This document applies to IFS MC251-4P/1CXT version 1.0.

Certification CE N4131

FCC compliance **Class A:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

ACMA compliance **Notice!** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Union directives	**2004/108/EC (EMC directive)**: Hereby, UTC Fire & Security declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2004/108/EC
	2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.
Contact information	www.utcfireandsecurity.com or www.interlogix.com
Customer support	www.interlogix.com/customer-support

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Overview

Package Contents

Before installing the IFS MC251-4P/1CXT Industrial Ethernet Converter, verify that the package contains the following parts:

- MC251-4P/1CXT x1
- DIN Rail Kit x1
- Wall Mount Kit x1
- User's Manual x1

If any of the items in the package are damaged or missing, please contact your distributor or IFS sales rep. If possible, retain the original carton and packaging material in case of need to return the product for repair/replacement.

Ethernet over VDSL2 Bridge Description

IFS's state-of-the-art Ethernet-over-VDSL2 products are based on two core networking technologies: Ethernet and VDSL2 (**Very-high-data-rate Digital Subscriber Line 2**). This technology offers the absolute fastest possible data transmission speeds over existing copper telephone lines or coaxial cables without the need for rewiring.

The IFS MC251-4P/1CXT PoE Industrial Ethernet Converter has a switching architecture with 4 PoE RJ-45 10/100Mbps Ethernet ports and one asymmetric or symmetric Ethernet over VDSL port (Asymmetric means upstream and downstream rate are not the same and Symmetric means upstream and downstream rate are similar) – the VDSL port can be RJ-11or BNC Connector.

The MC251-4P/1CXT can be set to Master or Slave mode via a DIP switch. The MC251-4P/1CXT (RJ-11) is connected with

another MC251-4P/1CXT device, the performance is up to 99/63Mbps for asymmetric data rate within 200m and up to 28/2Mbps at 1.4km. The MC251-4P/1CXT (BNC) performance is up to 99/65Mbps for asymmetric data rate within 200m and up to 31/4Mbps at 2.4km. This capability is ideal for use as an Ethernet extender for your existing Ethernet network.

With 4 PoE interfaces, the MC251-4P/1CXT is the ideal for small business and workgroups requiring to deploy PoE for the wireless access points, IP-based surveillance camera or IP phones in any places easily, efficiently and cost effective.

The IFS MC251-4P/1CXT Industrial Ethernet Converter is engineered in a slim metal enclosure that conforms to IP30 standards for deployment in demanding industrial environments.

The IFS MC251-4P/1CXT provides a lower cost replacement and smooth migration for existing Long Reach Ethernet (LRE) networks.

The cable specifications of the connection are listed as following:

- 10Base-T, Category 3, 4 or 5 UTP
- 100Base-TX, Category 5, 5e or 6 UTP
- Ethernet over VDSL2, Twisted-pair Telephone Wires
- Ethernet over VDSL2 Coaxial Cable

Note: Slave devices (CPE) must connect to the Master device (CO) through the telephone wire or coaxial cable. To define the MC251-4P/1CXT as a Master or Slave, please refer to the Mode DIP Switch section for more detail.

Key Features

The MC251-4P/1CXT provides the following key features:

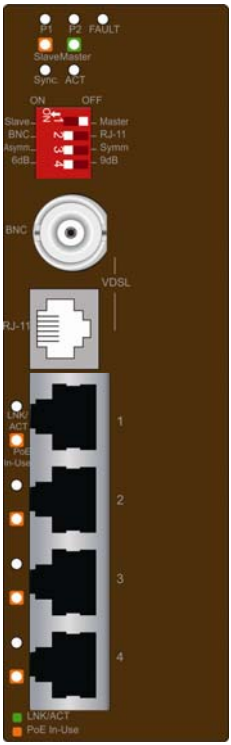
- 4 x Ports IEEE 802.3af Power over Ethernet Standard
- Each of PoE port provides 15.4 Watts
- Cost-effective VDSL2 Master / Slave bridge solution via DIP Switch
- Selectable BNC and RJ-11 mode for the data transmission
- -40 to 75 Degree C operating temperature
- Redundant Power Design: 24V or 48V DC, redundant power with polarity reverse protect function
- IP30 Aluminum metal case Protection
- Defines Asymmetric (Band Plan 998) and Symmetric band plans for the transmission of Upstream and Downstream signals
- Complies with IEEE 802.3, IEEE 802.3u and IEEE 802.3x standards
- DMT (Discrete Multi-Tone) line coding
- Half Duplex Back Pressure and IEEE 802.3x Full Duplex Pause Frame Flow Control
- Support up to 1536 bytes packet size, 802.1Q VLAN tag transparent
- Integrated address look-up engine, support 2K absolute MAC addresses
- VDSL2 Stand-Alone transceiver for simple bridge modem application
- Selectable Target Band Plan and Target SNR Margin
- LED indicators for network diagnostics
- DIN Rail and Wall Mount Design

Hardware Overview

The MC251-4P/1CXT provides 4 RJ-45 with PoE, 1 RJ-11 and 1 BNC port for network line connection. The 4 RJ-45 ports with two different data rates – 10Mbps and 100Mbps. The MC251-4P/1CXT will distinguish the speed of the incoming data automatically.

This section describes the hardware features of the PoE Industrial Media Converter. For easier control of the MC251-4P/1CXT, familiarity with its display indicators and ports. Front panel illustrations in this chapter display the unit LED indicators is important. Before connecting any network device to the MC251-4P/1CXT, read this chapter carefully.

Figure 1: Front Panel



LED Indicators

System

LED	Color	Function	
P1	**Green**	**Light**	Indicates that power 1 is active.
P2	**Green**	**Light**	indicates that power 2 is active.
FAULT	**Green**	**Light**	indicates that either power 1 or power 2 does not have power.

VDSL/BNC

LED	Color	Function	
ACT	**Green**	**Light**	Indicates that the VDSL link is established.
		Blink	Indicates that the VDSL link is actively sending or receiving data over that port.
Sync	**Green**	**Light**	Indicates that the VDSL link is established.
		Fast Blink	Indicates that the VDSL link is at training status (about 10 seconds).
		Slow Blink	Indicates that the VDSL link is at idle status.
Master	**Green**	**Light**	Indicates that the VDSL Bridge is running in **Master** mode.
Slave	**Green**	**Light**	Indicates that the VDSL Bridge is running in **Slave** mode.

10/100Base-TX with PoE Port

LED	Color	Function	
LNK/ ACT	**Green**	**Light**	Indicates that the port is link up.
		Blink	Indicates that the Converter is actively sending or receiving data over that port.
		Off	Indicates that the port is **link down.**
PoE in-Use	**Orange**	**Light**	Indicate the port is providing 48V DC in-line power. (Ports 1-4).

Mode DIP Switch

The MC251-4P/1CXT provides 4 selective transmission modes. By switching the transmission modes, you can obtain a best transmission mode to suit the phone line quality or

distance of connectivity. The following is a summary table of transmission settings, bandwidth and distance extensibility tested for AWG 24 (0.5mm) twisted-pair without noise and cross talk.

	DIP-1	DIP-2	DIP-3	DIP-4
	Mode	**Channel**	**Band Plan**	**SNR**
OFF	Master	Interleave	Symm	9dB
ON (default)	**Slave**	**Fast**	**Asymm**	**6dB**

Master / Slave

- Master (Central Office) – in Master device mode, usually the Master device will be located at the data center of the ISP or enterprise to link to the backbone. For IP video applications, the Master (CO) setting should be used at the IP camera for maximum bandwidth availability over distance.
- Slave (Customer Premises Equipment) – the Slave device mode, usually the Slave device will be located at thre branch office, home or remote side as the long reach data receiver. The Slave can also be connected to the network devices such as a PC, VoIP, Wireless Access Point, etc.

When the MC251-4P/1CXT is operating in Slave mode, the DIP switch 2, 3, and 4 are disabled.

Link Type

- BNC mode allows the MC251-4P/1CXT to connect and data transfer by using BNC cable

- RJ-11 mode allows the MC251-4P/1CXT to connect and data transfer by using Telephone Wire

Band Plan

- User can switch the Band Plan to either Symmetric or Asymmetric based on the application. Symmetric band plan provides better upstream performance while Asymmetric band plan provides a better downstream performance.

Target SNR (Signal Noise Ratio) Margin

- When fixed SNR margin is selected, the system will maintain the SNR margin at 9 dB across all usable loop length.

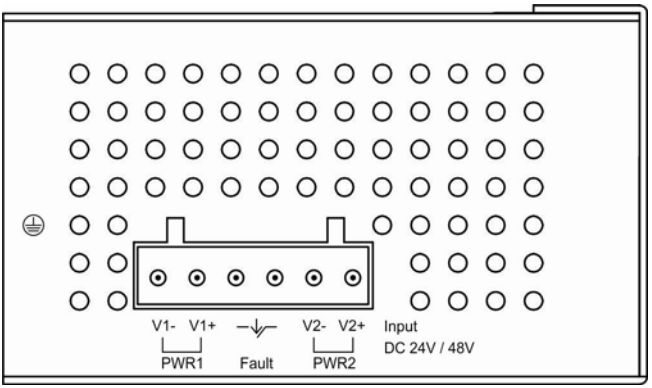
Note: The default for the DIP switch settings is "ON" for all four switches, that sets the media converter to CPE mode. For selecting "CO" mode, please adjust the DIP 1 switch to "OFF".

Please power off the MC251-4P/1CXT before making any transmission mode adjustments.

Top Panel

The top panel of the MC251-4P/1CXT consists of a terminal block connector with two DC power inputs. Figure 2 shows the top panel of the MC251-4P/1CXT.

Figure 2: Top Panel



Installation

Installing the MC251-4P/1CXT

The MC251-4P/1CXT does not require any software configuration. Users can immediately use any features of this product simply by attaching the cables and power plug. There are some key limitations on the MC251-4P/1CXT. Please check the following items:

MC251-4P/1CXT: The device is used for Point-to-Point connection only (Master device to Slave device) and is equipped with one RJ-11 and one BNC connectors for VDSL2 port for network link connection.

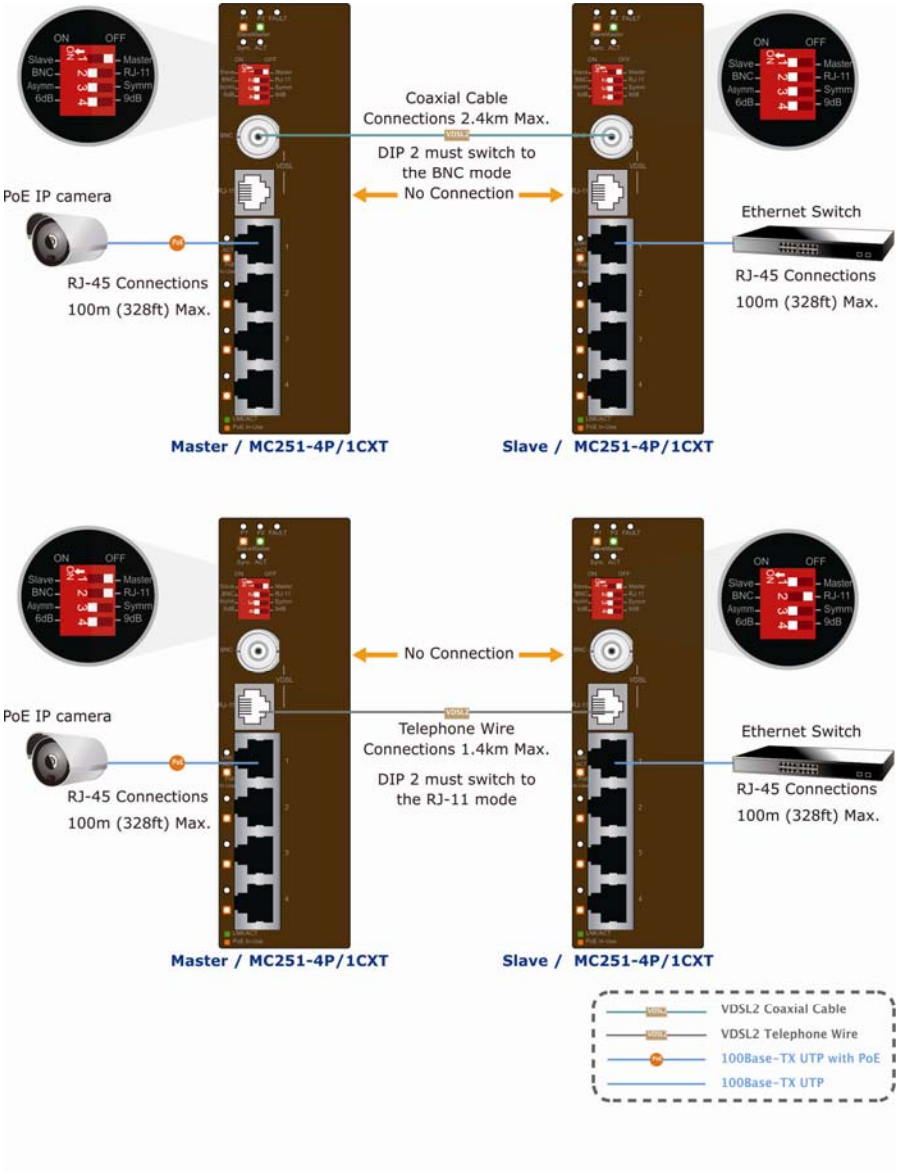
Phone wire: Depending on the quality of the telephone line being used, the maximum distance of one VDSL segment is 1.6km (5249ft) with AWG 24 telephone wires.

Coaxial: Depending on the quality of the coaxial cable being used, the maximum distance of one VDSL segment is 3.0km (9842ft) with 50 or 75 ohm coaxial cable.

The distance achieved will vary according to the quality of telephone wires and coaxial cables.

MC251-4P/1CXT BNC/RJ-11 Connection

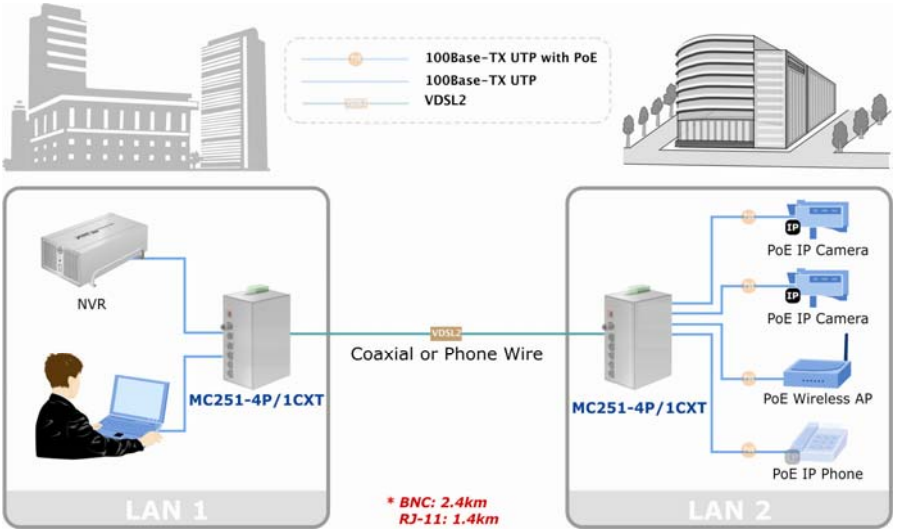
The IFS MC251-4P/1CXT has a DIP switch which can adjust the unit to be in Master or Slave mode. Connection of two IFS MC251-4P/1CXT units, one must be set to Master (CO) mode and the other must be set to Slave (CPE) mode. Please refer to the following figure.



MC251-4P/1CXT Application Connection

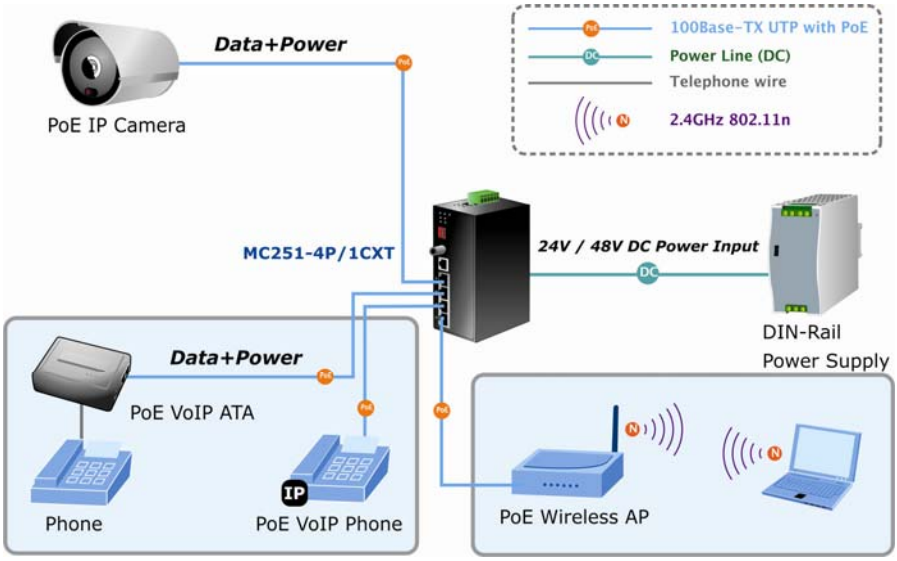
Two MC251-4P/1CXT can be used to link two different area networks. Through a normal telephone cable or coaxial cable, performance is 99/63Mbps (RJ-11) or 99/65Mbps (BNC) asymmetric backbone.

Figure 3: MC251-4P/1CXT BNC and RJ-11 connection



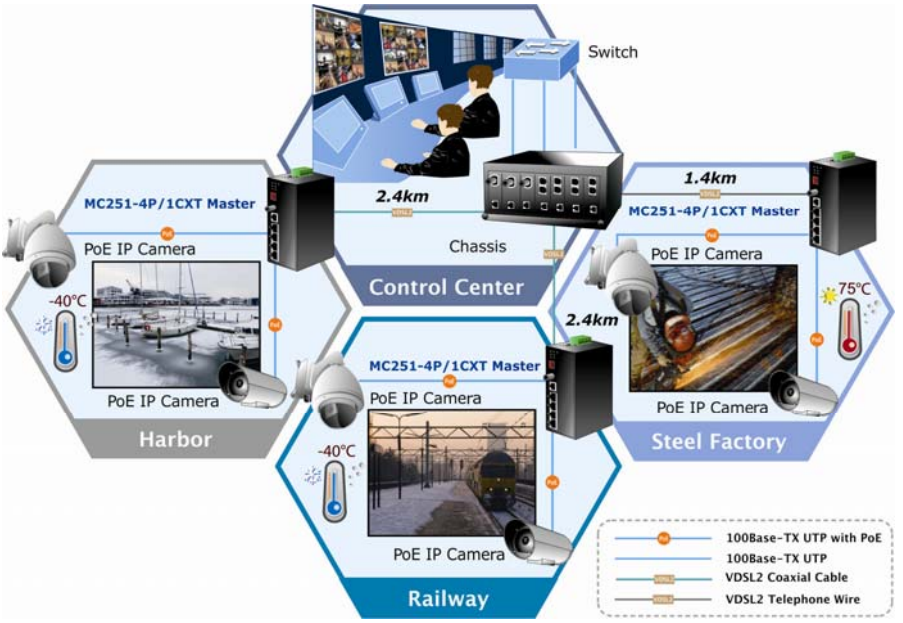
With 4 PoE, in-line power interfaces, the MC251-4P/1CXT can build a power central-controlled IP phone system, IP camera system, AP group for the enterprise. For instance, 4 camera / AP can be easily installed around the corner in the company for surveillance demands or build a wireless roaming environment in the offices. Without an AC power outlet limitation, it makes the installation of cameras or WLAN AP more easily and efficiently.

Figure 4: MC251-4P/1CXT PoE connection



MC251-4P/1CXT temperature range is from -40 to 75 Degree C which can handle any harsh environment and places. It is also compatible with IFS MCR200-1T/1CX and MC250-4T/1CXT. Without spending extra cost to deploy a new local Internet in apartment, hotel, campus and hospitality environment.

Figure 5: MC251-4P/1CXT Application Topology



The following details should be considered when deciding where to use the MC251-4P/1CXT:

- It is accessible and cables can be connected easily.
- Cabling is away from sources of electrical noise such as radios, transmitters and power lines and fluorescent lighting fixtures.
- Avoid the Water or moisture to reach the MC251-4P/1CXT.
- Air Flow around the unit and through the vents in the side of the case is not restricted (we recommend that it has a minimum of 25mm clearance).

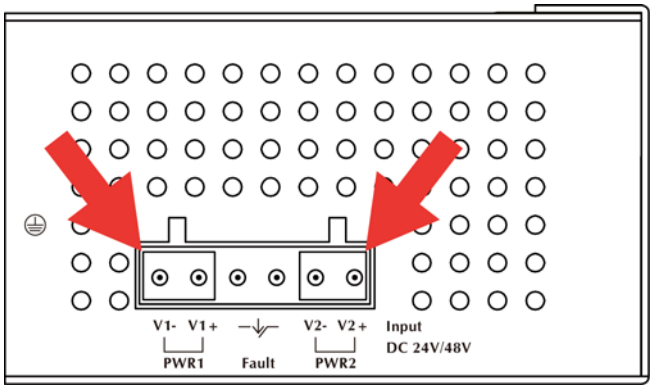
To prolong the operational life of your units:

- Do not place objects on top of any unit or stack.

Wiring the Power Inputs

The 6-contact terminal block connector on the top panel of the MC251-4P/1CXT is used for two DC redundant power inputs. Please follow the steps below to insert the power wires.

1. Insert positive / negative DC power wires into the contacts 1 and 2 for POWER 1, or 5 and 6 for POWER 2.



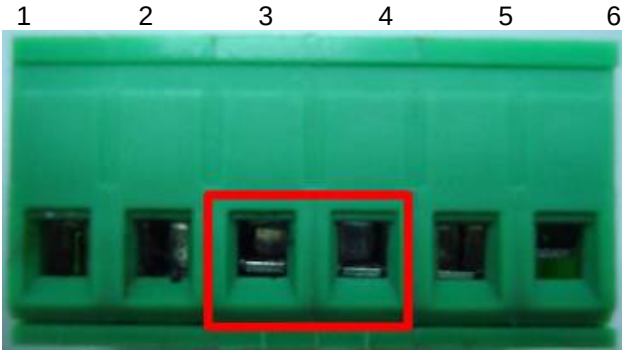
V1- V1+ V2- V2+

2. Tighten the wire-clamp screws to prevent the wires from disconnecting.

1	2	3	4	5	6
Power 1		Fault		Power 2	
-	+			-	+

Wiring the Fault Alarm Contact

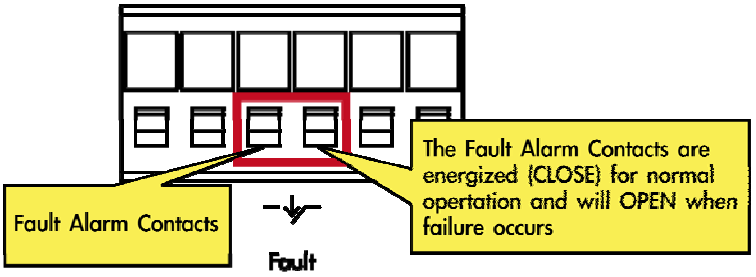
The fault alarm contacts are in the middle of the terminal block connector as the picture shows below. Inserting the wires, the MC251-4P/1CXT will detect the fault status of the power failure and then forms an open circuit. The following illustration shows an application example for wiring the fault alarm contacts.



Insert the wires into the fault alarm contacts

Note: The wire gauge for the terminal block should be in the range between 12 ~ 24 AWG.

The alarm relay circuit accepts up to 30V, max. 3A currents.


Fault Alarm Contacts
Fault
The Fault Alarm Contacts are energized (CLOSE) for normal opertation and will OPEN when failure occurs

Mounting Installation

This section describes how to mount the MC251-4P/1CXT and make connections to it. Please read the following sections and perform the procedures in the order presented.

Note: In the installation steps below, this Manual uses the IFS GE-DSGH-8 8 Port Industrial Gigabit Switch as an example. However, the steps for any IFS Industrial Switch & Industrial Media Converters are similar.

Mounting to a DIN-Rail

The DIN-Rail kit comes assembled on the MC251-4P/1CXT out of the box. Please refer to following figures to hang the MC251-4P/1CXT on a DIN-Rail.

1. Lightly press down and push the bottom of the DIN-Rail connector mount into the track.

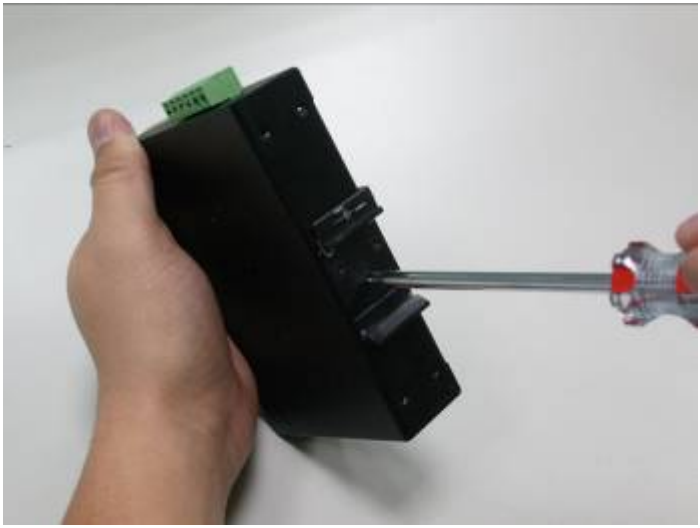
2. Check that the DIN-Rail connector mount is tightly mounted on the track.
3. Please refer to following procedures to remove the MC251-4P/1CXT from the track.

4. Lightly press down and pull the bottom of the DIN-Rail connector mount to remove it from the track.

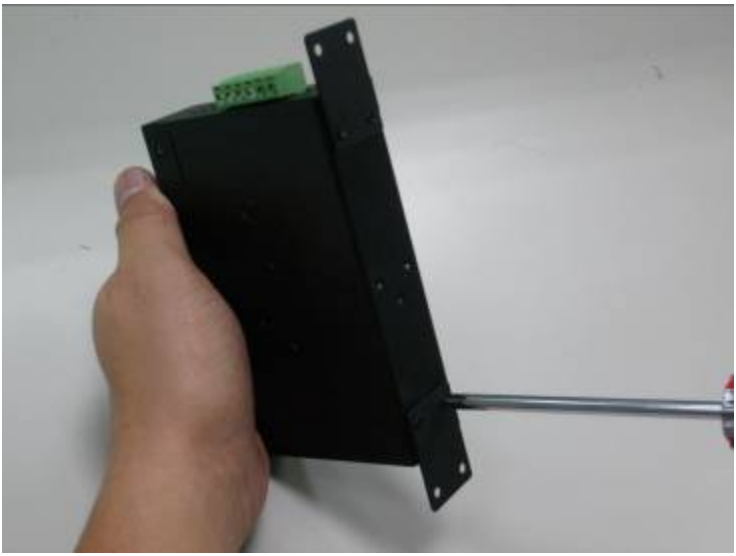
Mounting to a Wall

To install the MC251-4P/1CXT on the wall, please follows the instructions described below.

1. Loosen the screws to remove the DIN Rail from the Media Converter.



2. Place the wall mount plate on the rear panel of the MC251-4P/1CXT.



3. Assemble the wall mount plate on the MC251-4P/1CXT.
4. Use the hook holes at the corners of the wall mount plate to hang the MC251-4P/1CXT on the wall.

Troubleshooting

SYMPTOM:

VDSL LNK LED does not light after wire is connected to the VDSL port.

CHECKPOINT:

- Verify that the length of the wire connected between two MC251-4P/1CXT is not more than 2.4km. Please also try to adjust the DIP switch of the MC251-4P/1CXT to other SNR mode.
- Please note you must use one MC251-4P/1CXT with Master mode and the other MC251-4P/1CXT with Slave mode.

SYMPTOM:

TP LED does not illuminate after the cable is connected to the port.

CHECKPOINT:

- Verify that you are using the Cat. 5, 5e or 6 cables with an RJ-45 connector to connect to the port.
- If your device (i.e. LAN card) supports Auto-Negotiation, try to set it to a fixed speed manually.
- Make sure that both converter and the connected devices are turned on.
- Make sure that all cables are properly plugged into the correct ports.
- Make sure that the cable is not bad.
- Make sure that the power adapters are functional for each device.

FAQs

Q1: What is the voltage required to power the MC251-4P/1CXT media converter?

A1: 12 ~ 48V DC

Q2: What is VDSL2?

A2: VDSL2 (Very High-Bit-Rate Digital Subscriber Line 2), G.993.2 is the newest and most advanced standard of xDSL broadband wire line communications.

Designed to support the wide deployment of Triple Play services such as voice, data, high definition television (HDTV) and interactive gaming, VDSL2 enable operators and carrier to gradually, flexibly, and cost efficiently upgrade exiting xDSL-infrastructure.

Q3: What distances can be achieved between MC251-4P/1CXT media converters?

A3: Under ideal conditions and use of quality cable maximum distances of 1.4 km for telephone wire (POTS) or 2.4km for coax cable can be achieved.

Q4: What is the maximum date rate for MC251-4P/1CXT?

A4: Under ideal conditions and use of quality cable, maximum distances: 200 meters, 99Mbps/63Mbps (downstream/upstream) for telephone cable or 100Mbps/65Mbps (downstream/upstream) for coax cable.

Q5: What is SNR and what's the effect?

A5: In analog and digital communications, Signal-to-Noise Ratio, (SNR), is a measure of signal strength relative to

background noise. The ratio is usually measured in decibels (dB).

In digital communications, the SNR will probably cause a reduction in data speed because of frequent errors that require the source (transmitting) computer or terminal to resend some packets of data. SNR measures the quality of a transmission channel over a network channel. The greater the ratio, the easier it is to identify and subsequently isolate and eliminate the source of noise.

Generally speaking, the higher SNR value gets better line quality, but lower performance.

Q6: What is band plan and what's the effect?

A6: VDSL2 defines multiple band plans and configuration modes (profiles) to allow asymmetric and symmetric services in the same binder (by designated frequency bands) for the transmission of upstream and downstream signals. User has the ability to select fixed band plan. Symmetric band plan provides better downstream performance while Asymmetric band plan provides better upstream performance.

Specifications

Product		MC251-4P/1CXT
Hardware Specification		
Ports	10/100 Base-TX	4 x RJ-45, Auto-Negotiation and Auto-MDI/MDI-X
	PoE	4 x PoE (Port1 ~ Port4)
	VDSL	1 x RJ-11, female Phone Jack 1 x BNC, female connector
DIP Switch		4 position DIP switch
Functionality*1		**Master / Slave** mode select Selectable **BNC** and **RJ-11** mode Selectable target **Band Plan** Selectable target **SNR mode**
Encoding		VDSL-DMT - ITU-T G.997.1 - ITU-T G.993.1 VDSL - ITU-T G.993.2 VDSL2 (Profile 17a Support)
LED Indicators		P1 (Green) P2 (Green) Fault (Green) Master (Green) and Slave (Green) ACT (Green) Sync. (Green) PoE (Orange)
Power Over Ethernet	PoE Standard	IEEE 802.3af Power over Ethernet / PSE
	PoE Type	End-Span
	PoE Power Input	24V or 48V DC power input source
	PoE Power Output	48V DC Per Port, 350mA . Max. 15.4 Watts
	PoE Pin Assignment	1/2(+), 3/6(-)
Cabling	Ethernet	• 10Base-T: 2-pair UTP Cat.3,4,5 up to 100m (328ft) • 100Base-TX: 2-pair UTP Cat.5, 5e, 6 up to 100m (328ft)
	VDSL(RJ-11)	Twisted-pair telephone wires (AWG24 or better) up to 1.4km
	BNC	50 ohm: RG58A/U, RG58C/U, RG58/U and 75 ohm: RG6 (Distance 2.4km)
		Asymmetric Mode
		VDSL (RJ-11) / BNC

<table>
<tr><td rowspan="4">Performance*2
(Down Stream / Up Stream)</td><td>200m -> 99/63Mbps
400m -> 91/48Mbps
600m -> 71/32Mbps
800m -> 53/18Mbps
1000m -> 38/8Mbps
1200m -> 33/5Mbps
1400m -> 28/2Mbps</td><td>200m -> 99/65Mbps
400m -> 99/64Mbps
600m -> 97/59Mbps
800m -> 94/51Mbps
1000m -> 84/45Mbps
1200m -> 73/37Mbps
1400m -> 61/28Mbps
1600m -> 54/20Mbps
1800m -> 48/13Mbps
2000m -> 39/9Mbps
2200m -> 35/6Mbps
2400m -> 31/4Mbps</td></tr>
<tr><td colspan="2">Symmetric Mode</td></tr>
<tr><td>VDSL (RJ-11)</td><td>BNC</td></tr>
<tr><td>200m -> 91/99Mbps
400m -> 74/79Mbps
600m -> 54/51Mbps
800m -> 38/34Mbps
1000m -> 27/21Mbps
1200m -> 24/15Mbps
1400m -> 21/10Mbps</td><td>200m -> 95/99Mbps
400m -> 92/97Mbps
600m -> 81/82Mbps
800m -> 71/70Mbps
1000m -> 60/57Mbps
1200m -> 50/44Mbps
1400m -> 42/33Mbps
1600m -> 37/27Mbps
1800m -> 29/22Mbps
2000m -> 23/21Mbps
2200m -> 19/17Mbps
2400m -> 19/13Mbps</td></tr>
<tr><td>Dimensions (H x W x D)</td><td colspan="2">135mm x 87.8mm x50mm</td></tr>
<tr><td>Weight</td><td colspan="2">631g</td></tr>
<tr><td>Power Requirement</td><td colspan="2">24V or 48V DC for PoE Devices
Redundant power with polarity reverse protection function</td></tr>
<tr><td>Power Consumption / Dissipation</td><td colspan="2">66.4 Watts / 226BTU Max. (PoE)
5.64 Watts / 19.24BTU (Non-PoE)</td></tr>
<tr><td>Installation</td><td colspan="2">DIN Rail Kit and Wall Mount Ear</td></tr>
<tr><td colspan="3">Standard Conformance</td></tr>
<tr><td>Stability testing</td><td colspan="2">IEC60068-2-32(Free Fall)
IEC60068-2-27(Shock)
IEC60068-2-6(Vibration)</td></tr>
<tr><td>Operating Temperature</td><td colspan="2">-40 ~ 75ºC</td></tr>
<tr><td>Storage Temperature</td><td colspan="2">-40 ~ 85ºC</td></tr>
<tr><td>Operating Humidity</td><td colspan="2">10% to 90%, relative humidity, non-condensing</td></tr>
<tr><td>Storage Humidity</td><td colspan="2">10% to 90%, relative humidity, non-condensing</td></tr>
<tr><td>Regulation Compliance</td><td colspan="2">FCC Part 15 Class A, CE</td></tr>
<tr><td>Standards Compliance</td><td colspan="2">IEEE 802.3 10Base-T
IEEE 802.3u 100Base-TX
IEEE 802.3af Power over Ethernet
IEEE 802.3x Full Duplex Pause frame Flow Control
ITU-T
G.997.1
G.993.1 VDSL
G.993.2 VDSL2 (Profile 17a)</td></tr>
</table>

*1 BNC and RJ-11 mode must be switched to the same position for Master and Slave. Otherwise, it may cause instability.

*2. The actual data rate will vary on the quality of the copper wire and environment factors.

Contacting Technical Support

Contact technical support if you encounter any difficulties during this installation. Please make sure you have the requested diagnostic or log files ready before you contact us by phone or go to www.interlogix.com/customer-support.

Technical Support

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